

WHAT IS CLAIMED IS:

1. A process for the isomerization of a feed mixture of xylenes and ethylbenzene comprising contacting the feed mixture in the presence of hydrogen in an isomerization zone with a catalyst comprising from about 0.1 to 2 wt-% of a platinum-group component  
5 calculated on an elemental basis, from about 1 to 90 wt-% of a substantially mordenite-free MTW-type zeolite component, having a silica-to-alumina mole ratio of about 45 or less, and an inorganic-oxide binder component at isomerization conditions comprising a temperature of from about 300° to 500° C, a pressure of from about 1 to 50 atmospheres, a liquid hourly space velocity of from about 0.5 to 10 hr<sup>-1</sup> and a hydrogen-to-hydrocarbon  
10 mole ratio of from about 0:5:1 to 25:1 to obtain an isomerized product comprising a higher proportion of para-xylene than in the feed mixture with a C<sub>8</sub> aromatics ring loss relative to the feed mixture of less than about 4 mol-%.
2. The process of claim 1 wherein the zeolite silica to alumina ratio is in the range from about 20 to about 40.
- 15 3. The process of claim 1 wherein the substantially mordenite-free MTW-type zeolite component comprises less than about 20 wt-% mordenite.
4. The process of claim 3 wherein the substantially mordenite-free MTW-type zeolite component comprises less than about 10 wt-% mordenite.
5. The process of claim 4 wherein the substantially mordenite-free MTW-type  
20 zeolite component comprises less than about 5 wt-% mordenite

6. The process of claim 1 wherein ortho-xylene is recovered from one or both of the isomerized product and the feed mixture.

7. The process of claim 1 further comprising recovery of para-xylene by selective adsorption from the isomerized product.

5        8. The process of claim 1 wherein the platinum-group metal is platinum.

9. The process of claim 1 wherein the inorganic-oxide binder component comprises one or both of alumina and silica.

10. The process of claim 9 wherein the binder is alumina.

11. The process of claim 1 wherein the MTW-type zeolite component is present in  
10 the catalyst in an amount from about 2 wt-% to about 20 wt-%.

12. The process of claim 1 wherein the isomerized product yields benzene in an amount of less than about 1 wt-% of the feed mixture.

13. The process of claim 1 wherein the C<sub>8</sub> aromatics ring loss relative to the feed mixture is less than about 3.5 mol-%.

14. The process of claim 13 wherein the C<sub>8</sub> aromatics ring loss relative to the feed  
15 mixture is less than about 3 wt-%.

15. A process for the isomerization of a feed mixture of xylenes and ethylbenzene comprising contacting the feed mixture in the presence of hydrogen in an isomerization zone with a catalyst comprising from about 0.1 to 2 wt-% of a platinum-group component  
20 calculated on an elemental basis, from about 2 to 20 wt-% of a substantially mordenite-free MTW-type zeolite component, having a silica-to-alumina mole ratio of about 20 to 45, and an inorganic-oxide binder component at isomerization conditions comprising a

temperature of from about 300° to 500° C, a pressure of from about 1 to 50 atmospheres, a liquid hourly space velocity of from about 0.5 to 10 hr<sup>-1</sup> and a hydrogen-to-hydrocarbon mole ratio of from about 0.5:1 to 25:1 to obtain an isomerized product comprising a higher proportion of para-xylene than in the feed mixture with a C<sub>8</sub> aromatics ring loss relative to the feed mixture of less than about 3.5 mol-%.

16. The process of claim 15 wherein the substantially mordenite-free MTW-type zeolite component comprises less than about 10 wt-% mordenite.

17. The process of claim 15 wherein the isomerized product yields benzene in an amount of less than about 1 wt-% of the feed mixture.

18. A catalyst for isomerization of ethylbenzene into para-xylene with minimum benzene production, said catalyst comprising from about 0.1 to 2 wt-% of a platinum-group component calculated on an elemental basis, from about 1 to 90 wt-% of a substantially mordenite-free MTW-type zeolite component, having a silica-to-alumina mole ratio of about 45 or less, and an inorganic-oxide binder.

19. The catalyst of claim 18 further comprising from about 0.05 to about 1.0 wt-% sulfur.

20. The catalyst of claim 18 wherein the substantially mordenite-free MTW-type zeolite component comprises less than about 10 wt-% mordenite.